

REMARKS/ARGUMENTS

Before this Amendment, claims 1-17 were present for examination. Claims 1, 3, 4, 5, 8, 10, 12, 13 and 14 have been amended. No claims have been added or canceled. Therefore, claims 1-17 remain present for examination. Claims 1, 3, 12 and 13 are the independent claims.

The Office Action rejected claims 1, 2, 8 and 10 under 35 U.S.C. §102(b) as being anticipated by the cited portions of U.S. Patent No. 6,253,574 to Stockmann et al. (hereinafter "Stockmann"). The Office Action rejected claims 1, 12 and 16 under 35 U.S.C. §102(b) as being anticipated by the cited portions of U.S. Patent No. 5,473,900 to Low (hereinafter "Low"). The Office Action rejected claim 13 under 35 U.S.C. §102(b) as being anticipated by the cited portions of U.S. Patent No. 6,389,844 to Klein Nagel Voort et al. (hereinafter "Klein Nagel Voort").

The Office Action rejected claims 3, 4, 6, 7, 9 and 17 under 35 U.S.C. §103(a) as being unpatentable over obvious modifications of Klein Nagel Voort. The Office Action rejected claim 11 under 35 U.S.C. §103(a) as being unpatentable over obvious modifications of Klein Nagel Voort, and further in view of cited portions of U.S. Patent No. 6,308,531 to Roberts et al. (hereinafter "Roberts"). The Office Action rejected claim 14 under 35 U.S.C. §103(a) as being unpatentable over Low in view of Roberts. The Office Action rejected claim 15 under 35 U.S.C. §103(a) as being unpatentable over Klein Nagel Voort in view of Roberts.

Applicant notes with appreciation that the Examiner has deemed claim 5 allowable if Applicant were to rewrite the claim in independent form including all of the limitations of the claim from which it depends. However, at this time, Applicant wishes to continue prosecution on the independent claim from which it depends.

Applicant respectfully requests reconsideration of this application as presently amended and in light of the remarks below.

Amendments

Claims 1, 3, 4, 5, 8, 10, 12, 13 and 14 have been amended.

Applicant respectfully submits that that no new matter is believed to be added by any of the amendments.

Claim 1

The Office Action objected to claim 1 because of informalities concerning the limitations “the heat exchanger” and “this circuit”. Applicant has accepted the Examiner’s recommendations in regard to correcting these informalities and amended the limitations to instead recite “the pre-cooling heat exchanger” and “said additional circuit,” respectively.

Additionally, claim 1 has been amended to recite:

“(v) one additional circuit for removing heat from the main refrigerant in the main refrigerant circuit , where said additional circuit is separate from the pre-cooling refrigerant circuit such that said additional circuit does not exchange heat with the pre-cooling refrigerant circuit;

and wherein said main refrigerant circuit is separate from the pre-cooling refrigerant circuit such that said main refrigerant circuit does not exchange heat with the pre-cooling refrigerant circuit.”

Support for these amendments can be found throughout the specification and particularly at figure 1 and page 8, line 21 through page 9, line 2.

Claim 3

Applicant has amended the limitation “these circuits” to read “the additional circuits,” thereby clarifying which circuits were referred to.

Additionally, claim 3 has been amended to recite:

“(vi) at least two additional circuits for removing heat from the main refrigerants in each of the main refrigerant circuits, where the additional circuits are separate from the pre-cooling refrigerant circuit such that said additional circuits do not exchange heat with the pre-cooling refrigerant circuit;

and wherein said main refrigerant circuits are separate from the pre-cooling refrigerant circuit such that said main refrigerant circuits do not exchange heat with the pre-cooling refrigerant circuit."

Support for these amendments can be found throughout the specification and particularly at figure 2 and page 12, line 26 through page 13, line 2.

Claim 4

Claim 4 has been amended to recite "a refrigerant heat exchanger." Support for this amendment can be found throughout the specification and particularly at page 8, line 28 through page 9, line 2. Applicant respectfully submits that the Office Action's objection to an informality in claim 4 is now moot.

Claim 5

Applicant has amended the phrase "the additional circuits comprise each a ..." to read "the additional circuits each comprise a" This corrects a typographical error which resulted in a grammatical incorrect phrase.

Claim 5 has also been amended to recite "a refrigerant heat exchanger." Support for this amendment can be found throughout the specification and particularly at page 8, line 28 through page 9, line 2. Applicant respectfully submits that the Office Action's objection to an informality in claim 5 is now moot.

Claim 8

The Office Action objected to claim 8 because of informalities concerning the limitations "a heat exchanger" and "said heat exchanger". Applicant has accepted the Examiner's recommendations in regard to correcting these informalities and amended the limitations to instead recite "the pre-cooling heat exchanger" and "said pre-cooling heat exchanger," respectively.

Claim 10

The Office Action objected to claim 10 because of an informality concerning the use of "(vii)" where "(vi)" should have been used. Applicant has accepted the Examiner's recommendations in regard to correcting this informality and amended the claim to read "(vi)".

Claim 12

The Office Action objected to claim 12 because of informalities concerning the recitations “one heat exchanger,” “the heat exchanger,” “the natural gas,” “in” and “the main refrigerants.” Applicant has accepted the Examiner’s recommendations in regard to correcting these informalities and amended the limitations to instead recite “the main heat exchanger,” “the pre-cooling heat exchanger,” “the pre-cooled natural gas,” “using” and “main refrigerant,” respectively.

Additionally, claim 12 has been amended to recite:

“wherein the step of removing heat from the natural gas in step (iv) does not make use of said main refrigerant circuit to exchange heat with the pre-cooling refrigerant circuit.”

Support for this amendment can be found throughout the specification and particularly at figure 1 and page 8, line 21 through page 9, line 2.

Claim 13

The Office Action objected to claim 13 because of informalities concerning the recitations “the natural gas” and “in at least two additional circuits. Applicant has accepted the Examiner’s recommendations in regard to correcting these informalities and amended the limitations to instead recite “the pre-cooled natural gas” and “using at least two additional circuits,” respectively. Applicant has also amended the recitation “(iv)” to read “(v).” This corrects a typographical error which resulted in an incorrect step of the claimed process being referenced. Applicant respectfully submits that the Office Action’s objection to an informality in step (iv) of claim 13 regarding the use of the phrase “the natural gas” is now moot.

Additionally, claim 13 has been amended to recite:

“wherein the step of removing heat from the natural gas in step (v) does not make use of said main refrigerant circuits to exchange heat with the pre-cooling refrigerant circuit.”

Support for this amendment can be found throughout the specification and particularly at figure 2 and page 12, line 26 through page 13, line 2.

Claim 14

Applicant has amended the recitation “(vii)” to read “(vi).” This corrects a typographical error which resulted in an there being a step labeled “(vii)” without a step of “(vi)” existing, as neither claim 14, nor claim 12, the claim from which claim 12 depends, had a step labeled “(vi)” prior to this amendment.

Rejections

Independent Claim 1; Dependent Claims 2, 8 and 10

Claim 1 stands rejected as being anticipated by both Stockmann and Low.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. MPEP 2131.

Claim 1 has been amended to explicitly state what was previously implicit. The additional circuit was previously recited as being separate from the pre-cooling refrigerant circuit. Claim 1 now more explicitly states how the additional circuit is separate from the pre-cooling refrigerant circuit. Claim 1 now recites that “said additional circuit is separate from the pre-cooling refrigerant circuit *such that said additional circuit does not exchange heat with the pre-cooling refrigerant circuit*[.]” Likewise, with respect to the main refrigerant circuit, claim 1 now recites that “said main refrigerant circuit is separate from the pre-cooling refrigerant circuit *such that said main refrigerant circuit does not exchange heat with the pre-cooling refrigerant circuit*.”

The Office Action likens (1) the precooling refrigerant circuit (PRC) of Stockmann to the pre-cooling refrigerant circuit of claim 1; (2) the liquefaction refrigerant cycle (LRC) of Stockmann to the main refrigerant circuit of claim 1; and (3) the subcooling refrigerant cycle (SRC) of Stockmann to the additional circuit of claim 1. However, neither the LRC nor the SRC is separate from the PRC in Stockmann, as recited by amended claim 1. As shown in figure 1 of Stockmann and its associated description, both the LRC and the SRC exchange heat with the PRC in a first heat exchanger (see specifically, in figure 1 of Stockmann, lines from the PRC, LRC and SRC exchanging heat in heat exchanger E1). Therefore, because Stockmann does not contain each and every element of claim 1, the claim is not anticipated by Stockmann.

The Office Action also likens (1) the propane refrigeration cycle (PRC') of Low to the pre-cooling refrigerant circuit of claim 1; and (2) the ethylene refrigeration cycle (ERC) of Low to the main refrigerant circuit of claim 1. However, the ERC is not separate from the PRC' in Low, as recited by amended claim 1. As shown in figure 1 of Low and its associated description, the ERC exchanges heat with the PRC' in a heat exchanger (see specifically, in figure 1 of Low, lines from the PRC' and the ERC exchanging heat in heat exchanger 70). Therefore, because Low does not contain each and every element of claim 1, the claim is not anticipated by Low.

Because neither Stockmann nor Low anticipate claim 1, claim 1 is believed to be allowable, and withdrawal of the two §102(b) rejections is respectfully requested. Claims 2, 8 and 10 depend from claim 1 and are therefore also believed to be allowable at least by virtue of their dependence from an allowable base claim.

Independent Claim 3; Dependent Claims 4, 5, 6, 7, 9 and 11

Claim 3 stands rejected as being unpatentable over the obvious modification of Klein Nagel Voort.

To establish a prima facie case of obviousness, the prior art reference (or references when combined) must teach or suggest all the claim limitations. MPEP 2143.

Claim 3 has been amended in a similar fashion to claim 1. Claim 3 now more explicitly states how the additional circuits are separate from the pre-cooling refrigerant circuit. Claim 3 now recites that "the additional circuits are separate from the pre-cooling refrigerant circuit *such that said additional circuits do not exchange heat with the pre-cooling refrigerant circuit[.]*" Likewise, with respect to the main refrigerant circuits, claim 3 now recites that "said main refrigerant circuits are separate from the pre-cooling refrigerant circuit *such that said main refrigerant circuits do not exchange heat with the pre-cooling refrigerant circuit.*"

The Office Action states that the main refrigerant circuits are separate from the pre-cooling refrigerant circuit in Klein Nagel Voort. However, the two main refrigerant circuits are actually not separate from the pre-cooling refrigerant circuits in Klein Nagel Voort, as recited by amended claim 3. As shown in figure 1 of Klein Nagel Voort and its associated description,

each of the main refrigerant circuits exchange heat with the pre-cooling refrigerant circuit by way of the two refrigerant heat exchangers (see specifically, in figure 1 of Klein Nagel Voort, the first main refrigerant circuit 9 exchanging heat with the pre-cooling refrigerant circuit 3 at refrigerant heat exchanger 58; and the second main refrigerant circuit 9' exchanging heat with the pre-cooling refrigerant circuit 3 at refrigerant heat exchanger 58"). Therefore, because the cited art does not teach or suggest all the limitations of claim 3, a prima facie case of obviousness is not established even if the Applicant were to concede that the modifications to Klein Nagel Voort proposed by the Office Action were obvious, which Applicant does not concede.

Claim 3 is therefore believed to be allowable, and withdrawal of the §103(a) rejection is respectfully requested. Claims 4, 5, 6, 7, 9 and 11 depend from claim 3 and are therefore also believed to be allowable at least by virtue of their dependence from an allowable base claim.

Independent Claim 12; Dependent Claims 14 and 16

Claim 12 stands rejected as being anticipated by Low.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. MPEP 2131.

Claim 12 has been amended to explicitly state what was previously implicit. The claim previously recited that removing heat from the natural gas in the pre-cooling heat exchanger using a pre-cooling refrigerant circuit did not make use of the main refrigerant circuit. Claim 12 now more explicitly states how the pre-cooling heat exchanger circuit does not make use of the main refrigerant circuit. Claim 12 now recites that "wherein the step of removing heat from the natural gas in step (iv) *does not make use of said main refrigerant circuit to exchange heat with the pre-cooling refrigerant circuit.*"

As discussed above in regards to claim 1, Low does not teach a method or system which does not use the main refrigerant circuit (the ERC of Low) to exchange heat with the pre-cooling refrigerant circuit (the PRC' of Low). As shown in figure 1 of Low and its associated description, the ERC exchanges heat with the PRC' in a heat exchanger (see specifically, in

figure 1 of Low, lines from the PRC' and the ERC exchanging heat in heat exchanger 70). Therefore, because Low does not contain each and every element of claim 12, the claim is not anticipated by Low. Claims 14 and 16 depend from claim 12 and are therefore also believed to be allowable at least by virtue of their dependence from an allowable base claim.

Independent Claim 13; Dependent Claims 15 and 17

Claim 13 stands rejected as being anticipated by Klein Nagel Voort.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. MPEP 2131.

Claim 13 has been amended to explicitly state what was previously implicit. The claim previously recited that removing heat from the natural gas in the pre-cooling heat exchanger using a pre-cooling refrigerant circuit did not make use of the main refrigerant circuits. Claim 12 now more explicitly states how the pre-cooling heat exchanger circuit does not make use of the main refrigerant circuit. Claim 12 now recites that "wherein the step of removing heat from the natural gas in step (v) *does not make use of said main refrigerant circuits to exchange heat with the pre-cooling refrigerant circuit.*"

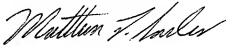
As discussed above in regards to claim 3, Klein Nagel Voort does not teach a method or system which does not use the main refrigerant circuit to exchange heat with the pre-cooling refrigerant circuit. As shown in figure 1 of Klein Nagel Voort and its associated description, each of the main refrigerant circuits exchange heat with the pre-cooling refrigerant circuit by way of the two refrigerant heat exchangers (see specifically, in figure 1 of Klein Nagel Voort, the first main refrigerant circuit 9 exchanging heat with the pre-cooling refrigerant circuit 3 at refrigerant heat exchanger 58; and the second main refrigerant circuit 9' exchanging heat with the pre-cooling refrigerant circuit 3 at refrigerant heat exchanger 58'). Therefore, because Klein Nagel Voort does not contain each and every element of claim 13, the claim is not anticipated by Klein Nagel Voort. Claims 15 and 17 depend from claim 13 and are therefore also believed to be allowable at least by virtue of their dependence from an allowable base claim.

CONCLUSION

For at least all of the foregoing reasons, Applicants believe all claims now pending in this Application are in condition for allowance and an action to that end is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 303-571-4000.

Respectfully submitted,



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